

LESSON #7: SOLVING RADICAL EQUATIONS (DAY 1)

Now:

- a) $(\sqrt{4})^2$
4
- b) $(\sqrt{2x-3})^2$
 $2x-3$
- c) $\sqrt{x^2} = \sqrt{9}$
 ± 3
- d) $(\sqrt{r})^2 = (\sqrt{17})^2$
 $r=17$

STEPS

1. ISOLATE the radical with the variable.
2. Solve for the variable by SQUARING both sides.
3. CHECK your solutions!!!!

1. $(\sqrt{d-1})^2 = (2)^2$
 $d-1 = 2$
 $+1 \quad +1$

NO SOLUTION

~~$d = 3$~~ x

$\sqrt{3-1} = 2$

$\sqrt{2} = 2x$

3. $\sqrt{2x-1} + 5 = 2$
 $\quad \quad -5 \quad -5$

$(\sqrt{2x-1})^2 = (-3)^2$

NO SOLUTION

$2x-1 = 9$
 $\quad \quad +1 \quad +1$

$2x = 10$
 $x = 5$

check:
 $\sqrt{2(5)-1} + 5 = 2$
 $\sqrt{9} + 5 = 2$
 $3 + 5 \neq 2$

2. $(\sqrt{x})^2 = (-3)^2$
 $x = 9$

$\sqrt{9} = 3 \neq -3$

NO SOLUTION

When solving radical equations we only use the principle root

4. $(\sqrt[3]{4-2a})^3 = (-2)^3$

$4-2a = -8$
 $\quad \quad -4 \quad \quad -4$

$-2a = -12$

$a = 6$

check: $\sqrt[3]{4-2(6)} = -2$

$\sqrt[3]{4-12} = -2$

$\sqrt[3]{-8} = -2$

$-2 = -2 \checkmark$

Solve for x. Justify your solutions.

$$5. (2\sqrt{x+8})^2 = (3\sqrt{x-2})^2$$

$$4(x+8) = 9(x-2)$$

$$4x + 32 = 9x - 18$$

$$\begin{array}{r} 4x + 32 \\ -4x + 18 \\ \hline 50 = 5x \\ 10 = x \end{array}$$

check: $2\sqrt{10+8} = 3\sqrt{10-2}$
 $8.4852 = 8.4852 \checkmark$

Practice

$$6. \sqrt{3x+7} + 2\sqrt{x-8} = 0$$

$$\quad \quad \quad -2\sqrt{x-8}$$

$$(\sqrt{3x+7})^2 = (-2\sqrt{x-8})^2$$

$$3x+7 = 4(x-8)$$

$$3x+7 = 4x-32$$

$$\begin{array}{r} 3x+7 \\ -3x+32 \\ \hline 39 = x \end{array}$$

check:

$$\sqrt{3(39)+7} + 2\sqrt{39-8} = 0$$

$$\sqrt{124} + 2\sqrt{31} = 0$$

$$22.271 \neq 0$$

NO SOLUTION

$$7. 8 = 5 + \sqrt{4x+17}$$

$$\quad \quad \quad -5 \quad -5$$

$$(3)^2 (\sqrt{4x+17})^2$$

$$9 = 4x+17$$

$$\begin{array}{r} 9 \\ -17 \\ \hline -8 = 4x \\ \frac{-8}{4} = \frac{4x}{4} \\ \boxed{x = -2} \end{array}$$

check:

$$8 = 5 + \sqrt{4(-2)+17}$$

$$8 = 5 + \sqrt{9}$$

$$8 = 5 + 3$$

$$8 = 8 \checkmark$$

$$8. \sqrt[3]{x+17} - 5 = -3$$

$$\quad \quad \quad +5 \quad +5$$

$$(\sqrt[3]{x+17})^3 = (2)^3$$

$$x+17 = 8$$

$$\begin{array}{r} x+17 \\ -17 \quad -17 \\ \hline \boxed{x = -9} \end{array}$$

check:

$$\sqrt[3]{-9+17} - 5 = -3$$

$$\sqrt[3]{8} - 5 = -3$$

$$2 - 5 = -3$$

$$-3 = -3 \checkmark$$

9. Simplify and write its restrictions:

$$\frac{2x^2 - 7x + 3}{(x-3)^2}$$

$$2x^2 - 6x - x + 3$$

$$2x(x-3) - 1(x-3)$$

$$\frac{(2x-1)(x-3)}{(x-3)^2}$$

$\frac{2x-1}{x-3}$ where $x \neq 3$